

## Cumulative Index 2005

Note: Page numbers of article titles are in **boldface** type.

### A

Accelerated diagnostic protocols (ADPs), in CPUs, 504

Accident(s), diving, patent foramen ovale and, history of, 98

ACCORD trial, in prevention of cardiovascular outcomes in type 2 diabetes, 215

ACE inhibitors. See *Angiotensin-converting enzyme (ACE) inhibitors*.

ACI. See *Acute coronary ischemia (ACI)*.

ACI predictive instrument. See *Acute coronary ischemia (ACI) predictive instrument*.

Acid(s), fatty, free, unbound, as biomarker of cardiac ischemia, 496

ACI-TIPI, for real-time and retrospective decision support, 602–603

ACI-TIPI clinical trial, multicenter, 603

ACI-TIPI demonstration project, TIPI information system cardiac error reduction system based on, 608–611

ACI-TIPI management tool, in medical error prevention, 605–606

ACSSs. See *Acute coronary syndromes (ACSSs)*.

Acute care facilities, financial pressures on, 589–590

Acute coronary ischemia (ACI), ED patients with, failure to hospitalize, studies of, 603–605

Acute coronary ischemia (ACI) predictive instrument, original, 602

Acute coronary syndromes (ACSSs), **401–409**  
clinical presentation of, chest discomfort in, 425–426  
ED demands of, 590  
ED triage for, medical error prevention in, **601–614**

ACI-TIPI for real-time and retrospective decision support in, 602–603  
decision support and risk reduction tools for real-time use in, 602  
ECG in, 603  
multicenter clinical trial, 603  
original ACI predictive instrument in, 602  
future directions in, 589  
in ED and CPUs, troponin for, 455–456  
missed diagnoses of, in ED, **423–451**  
angina pain equivalents and, 426–427  
atypical presentation-related, 427–428  
biochemical markers and, 435–437  
biomarkers of neurohumoral activation and inflammation and, 437  
cardiac imaging-related, 437–438  
central aortic pressure-related, 438  
chest discomfort-related, 425–426  
clinical presentation-related factors, 425  
computer-based decision aids and, 438–440  
creatine kinase and, 435–436  
described, 423–424  
ECG-related. See also under *Electrocardiography (ECG)*.  
ECG-related, 430–435  
Goldman Chest Pain Protocol-related, 438–439  
in women, causes of, 439–440  
methodologic issues related to, 424–425  
myocardial performance index-related, 438  
myoglobin and, 436–437  
outcomes of, 441–443  
past medical history-related, 428–429  
physical examination-related, 429–430  
Q wave-related, 432  
race-related, 440–441  
technetium-99m sestamibi myocardial perfusion imaging-related, 438  
troponin and, 436  
prevalence of, 401, 601  
risk scores, 403–404  
risk stratification for, 402

Acute coronary (*continued*)  
suspected, evaluation of, imaging in, 517–530  
acute myocardial perfusion imaging, 517–518  
cost-effectiveness of, 525  
diagnostic value in, 518–522  
in special populations, 524–525  
incorporation into chest pain evaluation, 525–527  
negative predictive value and prognosis, 519–521  
radiopharmaceutical issues in, 522–523  
sensitivity in, 518–519  
tracer injection timing in, 523–524  
troponin and, 523  
treatment of, 404–407  
antithrombotic agents in, 404–405  
reperfusion therapy in, 407  
STEMI-related, 406  
thrombolysis in, 406–407  
without myocardial infarction, evaluation of, imaging in, 519

Acute myocardial infarction, diabetes mellitus and, management of, intensive glycemic control in, 111–128

Acute myocardial perfusion imaging, in suspected ACS evaluation, 517–518

ADHF. See *Heart failure, acute decompensated*.

ADPs. See *Accelerated diagnostic protocols (ADPs)*.

$\alpha$ -Adrenergic agonists, for diabetes and hypertension, 144

ADVANCE trial, in prevention of cardiovascular outcomes in type 2 diabetes, 214–215

Albumin, ischemia modified, as biomarker of cardiac ischemia, 496

Albuminuria, cardiovascular disease in diabetics and, 132

Aldosterone antagonists, in ADHF management in EDOU, 583

Amplatzer atrial septal defect occluder, in patent foramen ovale closure, 78–79

Amputation, for peripheral arterial disease in CKD, 231

Amyloidosis, cardiac, NOCAD due to, 562

Anemia  
CKD and, 354

management of, in cardiovascular disease in renal transplant recipients, 338

Aneurysmal patent foramen ovale, 40–41

Angel Wings device, in patent foramen ovale closure, 79–80

Angina, described, 559

Angina pain, equivalents of, in ACS presentation, 428–429

Angioplasty, for cardiovascular disease in CKD, 305–307

Angiotensin, in diabetes mellitus prevention, 174

Angiotensin II-receptor blockers, for diabetes and hypertension, 144–145

Angiotensin-converting enzyme (ACE) inhibitors, for diabetes and hypertension, 142–143

Ankle brachial index less than 0.90, peripheral arterial disease in CKD and, prevalence of, 226

Anticoagulant(s), in ADHF management in EDOU, 583

Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial, 347

Anti-inflammatory drugs, nonsteroidal in ADHF management in EDOU, 583  
in hypertension, 240–241

Antioxidant(s)  
in dialysis, studies of, 325–326  
in uremia, 324–325

Antiplatelet agents  
for cardiovascular disease in renal transplant recipients, 337  
for peripheral arterial disease in CKD, 230

Antithrombotic agents, for ACSs, 404–405

Arterial disease, CKD and, 277

Arteriosclerotic cardiovascular disease, uremia-related factors for, 354

Arteriovenous fistulae  
for vascular access in hemodialysis, 249–250  
failure of, pathology of, 257–258  
prevalence of, 254–255  
rationale for, 256  
surveillance of, 256–257  
venous stenosis in, pathogenesis of, 260–262

Artery(ies), central, renal failure effects on, 313

Atherogenesis, accelerated, renal failure and, 313

Atherosclerosis, oxidative stress and, 320–321  
 Atherothrombosis, inflammation and, biomarkers of, 491–492  
 Atrial septal defect closure, in pediatric patients, 42–43  
 Atrial septal defect occlusion system, in patent foramen ovale closure, 81–82  
 Atrial septum, anatomy of, 36–37

**B**

Balanced Budget Act (BBA), 589  
 Balloon occlusion, temporary, trial of, 37–39  
 BARI 2D study, in prevention of cardiovascular outcomes in type 2 diabetes, 216  
**BBA.** See *Balanced Budget Act (BBA)*.  
 Beta-blockers  
     for ADHF in EDOU, 583  
     for cardiovascular disease in renal transplant recipients, 337  
     for CHF in CKD, 279  
     for diabetes and hypertension, 144  
 Biguanide(s), in prevention of cardiovascular disease in diabetics, 127–128  
 Binding proteins, fatty acid, in ED and CPUs, 455  
 Biochemical markers, missed diagnosis of ACS in ED due to, 437–439  
 Biomarkers  
     in ED and CPUs, 453–465  
         background of, 453–455  
         creatinine kinase myocardial band, 455  
         fatty acid binding protein, 455  
         for patients with ST elevation and myocardial infarction, 456–457  
         ischemia-related, 455–456  
         myoglobin, 455  
         troponin, 453–455  
             for high-risk patients with ACSs, 457–458  
             for intermediate and low risk patients, 458–460  
             for patients with ST elevation and myocardial infarction, 456–457  
             for renal failure patients, 460–461  
     of atherosclerosis and inflammation, 491–492  
     of CAD, 491–501  
     of cardiac ischemia, 495–497

B-type (brain) natriuretic peptide, 496–497  
 ischemia modified albumin, 496  
 unbound free fatty acid, 496  
 of inflammation  
     CD40 ligand, 494–495  
     C-reactive protein, 492–494  
     IL-6, 494  
     IL-10, 495  
     lipoprotein-associated phospholipase A2, 494  
     selectins, 495  
     serum amyloid A, 495  
 of neurohumoral activation and inflammation, 496  
 missed diagnoses of ACS in ED due to, 439  
 of plaque instability or rupture, 497–498  
 Blood pressure  
     management of  
         for peripheral arterial disease in CKD, 229  
         in cardiovascular disease in renal transplant recipients, 336  
         in prevention of cardiovascular outcomes in type 2 diabetes, 218–219  
     renal replacement therapy effects on, 386–387  
     target, in diabetics with hypertension, 148  
     thiazolidinediones effects on, in prevention of cardiovascular disease in diabetics, 129–130

Body weight, cardiovascular disease in diabetics and, 132

B-type (brain) natriuretic peptide  
     as biomarker of cardiac ischemia, 496–497  
     vs. filling pressures, in ADHF management in EDOU, 575  
 B-type (brain) natriuretic peptide assays, in ADHF management in EDOU, 574–575  
 B-type (brain) natriuretic peptide confounders, in ADHF management in EDOU, 575  
 Buttoned device, in patent foramen ovale closure, 79

Bypass Angioplasty Revascularization Investigation 2 Diabetes Trial, 190–191

**C**

CAD. See *Coronary artery disease (CAD)*.  
 Calcification, vascular  
     CKD and, 357  
     in renal failure, 373–384. See also *Renal failure, vascular calcification in*.

Calcium channel blockers  
for diabetes and hypertension, 144  
in ADHF management in EDOU, 583

Calcium–phosphate metabolism, renal  
replacement therapy effects on, 387–388

Cardiac amyloidosis, NOCAD due to, 562

Cardiac biomarker POCT  
applications of, 474–476  
in CPUs, 467–490  
algorithmic strategies, 479–481  
cost-effectiveness of, 479–481  
customer satisfaction, 481–482  
multimarkers, 479–481  
planning and implementation of, 482–484  
risk management, 481–482  
timeliness in, 478–479  
TTAT in, 477–478  
technologies for, 469–477  
types of, 470–472

Cardiac ischemia, biomarkers of, 495–497. See also *Biomarkers, of cardiac ischemia*.

Cardiac valvular abnormalities, in CKD, 350

Cardiologist(s), pediatric, in patent foramen ovale closure, 35–45. See also *Patent foramen ovale, closure of, pediatric cardiologist in*.

Cardiomyopathy  
CKD and, 276  
microvascular dysfunction and, NOCAD due to, 561

CardioSEAL septal occluder, in patent foramen ovale closure, 74–77

Cardiovascular diseases  
arteriosclerotic, uremia-related factors for, 354  
CKD and, 343–362, 363–372. See also *Chronic kidney disease (CKD), cardiovascular disease due to*.  
diabetes mellitus and  
prevention of, 121–139. See also *Diabetes mellitus, cardiovascular disease associated with, prevention of*.  
type 2, prevention of. See also *Diabetes mellitus, type 2, cardiovascular outcomes in, prevention of*.  
diabetes mellitus and, type 2, prevention of, 213–222  
ESRD and, 311, 349–350  
mortality due to, 385  
in renal replacement therapy patients, 349–350

in renal transplant recipients, management of, 331–342. See also *Renal transplant recipients, cardiovascular disease in, management of*.

renal failure and, pathophysiology of, 311–317.  
See also *Renal failure, cardiovascular disease and, pathophysiology of*.

Cardiovascular events, renal replacement therapy and, 388–389

Cardiovascular Health Study, 345–346, 353

Cardiovascular risk factors, in diabetics, comprehensive risk reduction of, 195–212. See also *Diabetes mellitus, cardiovascular risk factors in patients with, comprehensive risk reduction of*.

Catheter(s)  
cuffed double-lumen silicone, for vascular access in hemodialysis, 251–252  
in patent foramen ovale closure, 41–42

CD40 ligand, as biomarker of inflammation, 494–495

Centers for Medicare and Medicaid Services (CMS), 591–593

Central aortic pressure, missed diagnoses of ACS in ED due to, 440

Central arteries, renal failure effects on, 313

Chest discomfort, in ACS presentation, 427–428

Chest pain  
evaluation of, imaging of suspected ACS in, 525–527  
in ED  
EBCT for triaging patients with, 541–548  
MSCT for triaging patients with, 545  
stimulant use-related, in CPUs, 554–555  
with normal coronary angiogram, management of, 559–568. See also *Chest pain with normal coronary angiogram (NOCAD)*.

Chest pain centers (CPCs). See *Chest pain units (CPUs)*.

Chest pain units (CPUs)  
ADPs in, 504  
biomarkers in, 453–465. See also *Biomarkers, in ED and CPUs*.  
concept of, 411–421  
cost effectiveness of, 418–419, 589–599  
described, 504  
echocardiography in, 531–539

efficacy of, 415–418  
emergence of, 591  
examples of, 414–415  
exercise testing in, **503–516**  
as indicator of low clinical risk, 503–504  
described, 507–510  
early  
current guidelines for, 505–506  
initial recommendations for, 504–505  
initial studies of, 506–507  
immediate, 510–513  
in special groups, 512  
issues related to, 512–513  
vs. myocardial scintigraphy, 511–512  
federal regulations for, 593–594, 595–596  
for acute coronary syndrome patients, 591  
for special patients, **549–557**  
CAD-related, 551–553  
chest pain related to stimulant use, 554–555  
diabetics, 553–554  
women, 549–551  
implementation of, 411–414  
origin of, 589  
quality implications of, 594  
reimbursement issues related to, 591–593  
synonyms for, 504  
trans-theoretic Y model application in, 594,  
596–598  
women in, management of, 549–551

Chest pain with normal coronary angiogram (NOCAD)  
cardiomyopathy and, 561  
coronary spasm and, 561, 563–564  
differential diagnosis of, 560  
endothelial dysfunction and, 559–561, 563  
epicardial disease and, 560–561  
hypertension and, 561  
management of, **559–568**  
microvascular disease and, 561–562, 565  
microvascular dysfunction and, 560, 565  
idiopathic, 562  
microvascular endothelial dysfunction and,  
561, 565  
myocardial bridging due to, 561, 564–565  
noncoronary causes of, 560, 562  
diagnosis of, systemic approach to,  
562–563  
pathophysiology of, 559–560  
prognosis of, 563–565  
valvular disease and, 562

CHF. See *Congestive heart failure (CHF)*.

Children, atrial septal defect closure in, 42–43

Choline, whole blood, as biomarker of plaque instability or rupture, 497

Chronic kidney disease (CKD)  
anemia and, 354  
arterial disease due to, 277  
CAD in, **285–298**  
assessment of, 285–286  
outcomes of, 293–294  
risk factors for  
in dialysis patients, 286–287  
in nondialysis patients, 287–289

cardiac valvular abnormalities in, 350

cardiovascular disease due to, **343–362**,  
**363–372**  
accelerated, pathophysiology of, 350–357

Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial, 347

British population-based study, 346

Cardiovascular Health Study, 345–346  
described, 345–347

Framingham Offspring community study,  
346

Hoorn study, 345

HOPE study, 346

managed care group database analysis,  
346–347

management of  
medical therapy in, 307–308  
primary angioplasty in, 305–307  
rationale for, 304–305

pathophysiology of, 276–277

percutaneous coronary interventions for,  
**299–310**  
creatinine levels after, outcome-related,  
300–301

renal protection for, rationale for, 301

risk factors for, 299–300

Second National Health and Nutrition Examination Survey mortality study,  
346

studies of, 345–347  
conclusions from, 347–349

CHF in, **275–284**  
epidemiology of, 277

management of, 278–280  
beta-blockers in, 279  
diabetes management in, 279  
dialysis in, 279  
digoxin in, 279  
diuretics in, 279  
erythropoietin in, 279  
hypertension management in, 278–279

Chronic kidney disease (CKD) (*continued*)  
nephrology referral in, 279  
renin-angiotensin system interruption in,  
    279  
smoking cessation in, 279  
statins in, 279  
pathophysiology of, 276–277  
risk factors for, 277–278  
chronic microinflammation and, 355–357  
coronary pathobiology in, 304  
diabetes mellitus and, 351, 365  
dyslipidemia in, 351–353, 364–365  
    interactions between, mechanisms for, 366  
    treatment of, 366–367  
erythropoietin for, 354–355  
health care perspective on, 275  
hypertension in, 237–248, 350. See also  
    *Hypertension, in CKD*.  
inflammation in, markers of, 353  
ischemic heart disease due to, 276–277  
left ventricular hypertrophy and, 355  
lipids and, 365  
microalbuminuria and, 350–351  
myocardial stress in, biomarkers of, 357–358  
nontraditional modifiable factors in, 353  
oxidative pathways in, 319–330. See also  
    *Oxidative stress*.  
oxidative stress and, 355–357  
patient perspective on, 275–276  
peripheral arterial disease in  
    ankle brachial index less than 0.90 due to,  
        prevalence of, 226  
    diagnostic testing for, 226–227  
    epidemiology of, 225–228  
    impact of, 228  
    incidence of, 227–228  
    intermittent claudication due to, prevalence  
        of, 225–226  
    management of, 225–236  
        amputation in, 231  
        antiplatelet agents in, 230  
        blood pressure-lowering agents in, 229  
        cilostazol in, 230  
        exercise in, 230  
        revascularization in, 230–231  
        smoking cessation in, 229–230  
        statin therapy in, 228–229  
        surgical, 230–231  
    prevalence of, 225  
peripheral vascular disease in  
    outcomes of, 290–293  
    risk factors for, 289–290  
proteinuria and, 350–351  
stages of, 343–344, 364  
    impact on cardiovascular biology, 344–345  
valve replacement in, 350  
vascular calcification and, 357  
Cilostazol, for peripheral arterial disease in CKD,  
    230  
CKD. See *Chronic kidney disease (CKD)*.  
Claudication, intermittent, peripheral arterial  
    disease in CKD and, prevalence of, 225–226  
CMS. See *Centers for Medicare and Medicaid  
Services (CMS)*.  
Coagulation, cardiovascular disease in diabetics  
    and, 131  
Cocaine, in hypertension, 240  
Computer-based decision aids, missed diagnoses  
    of ACS in ED due to, 440–442  
Congenital heart disease, patent foramen ovale  
    and, 37–39  
Congestive heart failure (CHF)  
    cardiovascular disease in renal transplant  
        recipients due to, 333–334  
    in CKD, 275–284. See also *Chronic kidney  
disease (CKD), CHF in*.  
Consent, informed, for patent foramen ovale  
    closure, 18–19  
Contrast-induced nephropathy  
    pathophysiology of, 301–302  
    prevention of, 302–304  
Coronary angiogram, normal, chest pain and,  
    management of, 559–568. See also *Chest pain  
with normal coronary angiogram (NOCAD)*.  
Coronary artery bypass grafting, percutaneous  
    coronary intervention vs., in diabetics,  
    187–193. See also *Diabetes mellitus,  
percutaneous coronary intervention vs. coronary  
artery bypass grafting in*.  
Coronary artery disease (CAD)  
    biomarkers of, 491–501  
    in CKD, 285–298. See also *Chronic kidney  
disease (CKD), CAD in*.  
    likelihood of, 402–403  
    management of, in CPUs, 551–553  
    prevalence of, 402–403  
Coronary revascularization, in diabetics, 187  
Coronary spasm, NOCAD due to, 561, 563–564  
CPUs. See *Chest pain units (CPUs)*.

C-reactive protein, as biomarker of inflammation, 492–494

Creatine kinase, missed diagnoses of ACS in ED due to, 437–438

Creatine kinase myocardial band, in ED and CPCs, 455

Cuffed double-lumen silicone catheters, for vascular access in hemodialysis, 251–252

Cyclosporine, in hypertension, 240

## D

Diabetes mellitus

acute myocardial infarction with, management of, intensive glycemic control in, 111–128

as coronary heart disease risk-equivalent, 155

burden of, 167

cardiovascular disease associated with

albuminuria and, 132

body weight and, 132

coagulation and, 131

fibrinolysis and, 131

glycemic control effects on, 122–123

inflammation and, 131

insulin resistance effects on, 122–123

insulin sensitizing agents effects on, 123

prevalence of, 121

prevention of, 121–139

insulin secretagogues in, 123–126

insulin sensitizing agents in, 127–132

metformin in, 128

nonsulfonylurea secretagogues in, 127

thiazolidinediones in, 128–131

treatment of, 132–133

cardiovascular risk factors in patients with comprehensive reduction of, 195–212

current state of affairs, 209–210

dyslipidemia, 197–199

future directions related to, 209–210

hyperglycemia, 202–203

hypertension, 199–202

increased thrombotic tendency, 203–204

multiple risk factor intervention for, 204–208

practical considerations related to, 208–209

CKD and, 351, 365

coronary revascularization in, 187

ESRD due to, 363

hypertension and, 141–153

described, 141–142

renal failure with, treatment of, 147

target blood pressure in patients with, 148

treatment of

ACE inhibitors in, 142–143

$\alpha$ -adrenergic agonists in, 144

angiotensin II-receptor blockers in, 144–145

antihypertensive agents in, 145–147

B-blockers in, 144

calcium channel blockers in, 144

combination therapy in, 148–150

drugs in, 142–150

surrogate markers in, 147

thiazide diuretics in, 143–144

lipid management in, 155–164

combination therapy in, 161–162

evidence from, 156–157

goals in, 159

principles of, 159–161

lipoprotein abnormalities associated with, 155–156

management of

in CHF in CKD, 279

in CPUs, 553–554

renin-angiotensin system in, 168–170

new onset, renin angiotensin system in, 176–177

percutaneous coronary intervention *vs.* coronary artery bypass grafting in, 187–193

Bypass Angioplasty Revascularization

Investigation 2 Diabetes Trial, 190–191

described, 187–189

emerging therapies, 191–192

repeat vascularization, 189

prevention of

lifestyle modifications in, 168, 174–176

renin angiotensin system in, 167–185

renin-angiotensin system in, 167–185

activation of, 170–172

as preventive agent, 167–185

as therapeutic agent, 167–185

in endothelial function, 174

in new onset diabetes, 176–177

in vascular endothelial function, 172–173

interaction between angiotensin,

endothelium, and insulin resistance, 174,

177–180

risk factors for, 167–168

triglyceride and high-density lipoprotein

intervention in, 157–159

type 2

cardiovascular outcomes in, prevention of,

213–222

blood pressure interventions in,

218–219

**Diabetes mellitus (continued)**

- clinical trials examining glycemic management techniques in, 215–218
- clinical trials examining glycemic targets in, 214–215
- lifestyle interventions in, 219–220
- lipids in, 218–219
- nonglycemic therapies in, 218–220
- revascularization interventions in, 218
- described, 213

**Diagnostic value**

- in suspected ACS evaluation, 518–522
- incremental, in suspected ACS evaluation, 521–522

**Dialysis**

- antioxidants in, studies of, 325–326
- hypertension in patients on, 241–242
- in CHF in CKD management, 279

**Digoxin**

- in ADHF management in EDOU, 583
- in CHF in CKD management, 279

**Diuretic(s)**

- in ADHF management in EDOU, 581–582
- in CHF in CKD management, 279
- thiazide, for diabetes and hypertension, 143–144

**Diving, patent foramen ovale and, 97–104.** See also *Patent foramen ovale, diving and*.

**Diving accidents, patent foramen ovale and, history of, 98**

**DREAM study, in prevention of cardiovascular outcomes in type 2 diabetes, 217–218**

**Drug(s), in hypertension, 240–241**

**Dyslipidemia**

- in CKD, 351–353, 364–365
- mechanisms for, 366
- treatment of, 366–367
- in diabetes mellitus, 197–199

---

**E**

**EBCT. See *Electron beam CT (EBCT)*.**

**ECG. See *Electrocardiography (ECG)*.**

**Echocardiographer(s), in placement of patent foramen ovale closure devices, 53–64**

**Echocardiography**

- in CHCs, 531–539

intracardiac, in placement of patent foramen ovale closure devices, pertinent views to obtain with, 57–60

missed diagnoses of ACS in ED due to, 439–440

**three-dimensional**

- in patent foramen ovale diagnosis, 51
- in placement of patent foramen ovale closure devices, 60–64

**transesophageal**

- in patent foramen ovale diagnosis, 49–50
- in placement of patent foramen ovale closure devices, 54–57

**transthoracic, in patent foramen ovale diagnosis, 47–49**

**ED. See *Emergency department (ED)*.**

**EDOU. See *Emergency department (ED) observation unit (OU)*.**

**Education**

- family, patent foramen ovale closure device-related, 18–19
- patient, patent foramen ovale closure device-related, 18–19

**Electrocardiography (ECG)**

- continuous/serial ECG, in ACS diagnosis, 437
- diagnostic accuracy of, in ACS diagnosis, 432–437
- exercise stress, in ACS diagnosis, 437
- “nondiagnostic” patterns of, in ACS diagnosis, 434
- non-standard lead, in ACS diagnosis, 437
- normal, in ACS diagnosis, 434
- prehospital 12-lead, in ACS diagnosis, 434–437
- with ACI-TIPI for real-time and retrospective decision support in medical error prevention in ED triage for ACS, 603

**Electrolyzed-reduced water treatment, for hemodialysis, 326**

**Electron beam CT (EBCT), for triaging patients presenting to ED with chest pain, 541–548**

**Emergency department (ED)**

- acute coronary syndrome demands on, 588
- biomarkers in, 453–465. See also *Biomarkers, in ED and CPUs*.
- chest pain in patients presenting to, EBCT for triaging, 541–548
- missed diagnoses of ACSs in, 423–451. See also *Acute coronary syndromes (ACSS), missed diagnoses of, in ED*.

Emergency department (ED) observation unit (OU), in ADHF management, **569–588**. See also *Heart failure, acute decompensated*. aldosterone antagonists in, 583 anticoagulants in, 583 beta-blockers in, 583 B-type natriuretic peptide assays in, 574–575 B-type natriuretic peptide confounders in, 575 B-type natriuretic peptide *vs.* filling pressures in, 575 calcium channel blockers in, 583 candidates for, 578–581 diagnostic evaluation in, 572 digoxin in, 583 diuretics in, 581–582 early management, benefits of, 578 economics of, 569–570 general support in, 577–578 neurohormones in, 572–573 NSAIDs in, 583 N-terminal pro-B-type natriuretic peptide in, 576–577 OU disposition in, 583–584 vasodilators in, 582

Emergency department (ED) triage, for ACS, medical error prevention in, **601–614**. See also *Acute coronary syndrome (ACS)*, *ED triage for, medical error prevention in*.

Endothelial function, renin angiotensin system in, 174

Endothelial sodding/seeding, for venous neointimal hyperplasia in dialysis access, 265–266

Endothelium dysfunction of, NOCAD due to, 559–561, 563 function of, 559–560 in diabetes mellitus prevention, 174

End-stage renal disease (ESRD); cardiovascular disease in, 349–350 cardiovascular risk in, 311 death due to, causes of, 385 diabetes and, 363

Epicardial disease, NOCAD due to, 560–561

Erythropoietin for CKD, 354–355 in CHF in CKD management, 279 in hypertension, 240

ESRD. See *End-stage renal disease (ESRD)*.

Exercise, for peripheral arterial disease in CKD, 230

Exercise testing, in CPUs, **503–516**. See also *Chest pain units (CPUs), exercise testing in*.

## F

Family education, patent foramen ovale closure device-related, 18–19

Fatty acid(s), free, unbound, as biomarker of cardiac ischemia, 496

Fatty acid binding protein, in ED and CPCs, 455

Fibrinolysis, cardiovascular disease in diabetics and, 131

Fistula(æ), arteriovenous. See *Arteriovenous fistulae*.

Free fatty acid(s), unbound, as biomarker of cardiac ischemia, 496

## G

Gene therapy, for venous neointimal hyperplasia in dialysis access, 265

Glycemic control, intensive, for acute myocardial infarction in diabetics, **111–118**

Glycemic management techniques, in prevention of cardiovascular outcomes in type 2 diabetes, clinical trials of, 215–218

Glycemic targets, in prevention of cardiovascular outcomes in type 2 diabetes, clinical trials of, 214–215

Goldman Chest Pain Protocol, missed diagnoses of ACS in ED due to, 440–441

## H

Headache(s), migraine, patent foramen ovale in, **91–96**. See also *Patent foramen ovale, in migraine headache*.

Heart, renal failure effects on, 313–314

Heart disease

congenital, patent foramen ovale and, 37–39

ischemic cardiovascular disease in renal transplant recipients due to, 334–335

CKD and, 276–277

Heart failure

acute decompensated

clinical features of, 573

**Heart failure (continued)**

- diagnostic evaluation of, 7–8, 574
- differential diagnosis of, 573–574
- management of, in EDOU, **569–588**. See also *Emergency department (ED) observation unit (OU), in ADHF management*.
- pathophysiology of, 571–572
- prognosis of, 576
- epidemiology of, 569–571
- vascular access in hemodialysis and, 253–254

**Heart Outcome and Prevention Evaluation (HOPE) study, subgroup analyses of**, 346

**Helex device, in patent foramen ovale closure**, 81

**Hemodialysis**

- electrolyzed-reduced water treatment for, 326
- home, nocturnal, cardiovascular improvements and, physiologic link between, 389
- hypertension in, reverse epidemiology of, 243–244
- vascular access in, **249–273**
  - arteriovenous fistulae, 249–250
  - pathology of, 257–258
  - prevalence of, 254–255
  - rationale for, 256
  - surveillance of, 256–257
  - venous stenosis in, pathogenesis of, 260–262
- clinical standard of care for, 254–257
- complications of, 252–254
- cuffed double-lumen silicone catheters, 251–252
- dysfunction, management of, lack of effective therapies in, 262–264
- future directions in, 266–267
- heart failure due to, 253–254
- infections due to, 252–253
- polytetrafluoroethylene grafts, 250–251
- venous stenosis in, pathogenesis of, 260–262
- types of, 249–254
- venous neointimal hyperplasia in, novel therapies for, 264–266

**Hemodialyzer(s), vitamin E-bonded**, 326

**Home hemodialysis, nocturnal, cardiovascular improvements and, physiologic link between**, 389

**Homocysteine, levels of, renal replacement therapy effects on**, 388

**Hoorn study**, 345

**HOPE study, subgroup analyses of**, 346

**Hypercoagulable states, in patent foramen ovale**, **65–71**

**Hyperglycemia, in diabetes mellitus**, 202–203

**Hyperparathyroidism, renal replacement therapy effects on**, 387–388

**Hypertension**

- diabetes mellitus and, **141–153**, 199–202. See also *Diabetes mellitus, hypertension and* in CKD, **237–248**, 350
  - management of, 241, 278–279
  - agents in, 242–243
- in dialysis patients, 241–242
- in hemodialysis, reverse epidemiology of, 243–244
- microvascular dysfunction and, NOCAD due to, 559
- pathophysiology of, 237–241
- circulating inhibitors of nitric oxide in, 239
- cocaine in, 240
- cyclosporine in, 240
- drugs in, 240–241
- erythropoietin in, 240
- lead in, 240
- nitric oxide in, 239
- NSAIDs in, 240–241
- oxidative stress in, 238–239
- renin-angiotensin system in, 238
- sodium and water in, 237–238
- sympathetic nervous system in, 239–240
- toxins in, 240

**Hypoxemia, nocturnal, renal replacement therapy and**, 388

---

**I**

**IL. See *Interleukin(s) (IL)***.

**Imaging, in suspected ACS evaluation**, **517–530**. See also specific modalities and *Acute coronary syndromes (ACSs), suspected, evaluation of, imaging in*.

**Incremental diagnostic value, in suspected ACS evaluation**, 521–522

**Infection(s), vascular access in hemodialysis and**, 252–253

**Infiltrative disease, microvascular dysfunction and, NOCAD due to**, 562

**Inflammation**

- atherothrombosis and, biomarkers of, 491–492
- biomarkers of, 491–495. See also *Biomarkers, of inflammation*.
- missed diagnoses of ACS in ED due to, 439
- cardiovascular disease in diabetics and, 131
- oxidative stress and, in CKD, 323–324

Informed consent, for patent foramen ovale closure, 18–19

**Insulin resistance**

- cardiovascular disease in diabetics and, 122–123
- in diabetes mellitus prevention, 174, 177–180

**Insulin secretagogues, 123–126**

- in prevention of cardiovascular disease in diabetics, 121–139
- sulfonylureas, 123–126

**Insulin sensitizing agents, 127–132**

- in prevention of cardiovascular disease in diabetics, 121–139
- biguanides, 127–128

**Interleukin(s) (IL)**

- IL-6, as biomarker of inflammation, 494
- IL-10, as biomarker of inflammation, 495

Intracardiac echocardiography, in placement of patent foramen ovale closure devices, pertinent views to obtain with, 57–60

Intracardiac shunt, closure of, effect on migraines, 94

**Ischemia**

- cardiac, biomarkers of, 455–456, 491–501. See also *Biomarkers, of cardiac ischemia*.
- myocardial, in ED and CPU patients, troponin for, 456–457

Ischemia modified albumin, as biomarker of cardiac ischemia, 496

**Ischemic heart disease**

- cardiovascular disease in renal transplant recipients due to, 334–335
- CKD and, 276–277

**K**

Kidney disease. See *Renal disease*.

**L**

Lead, in hypertension, 240

Left ventricular hypertrophy

**cardiovascular disease in renal transplant recipients due to, 332–333**

CKD and, 355

**Lifestyle modifications**

- in diabetes prevention, 168, 174–176
- in prevention of cardiovascular outcomes in type 2 diabetes, 219–220

**Ligand(s), CD40, as biomarker of inflammation, 494–495**

**Lipid(s)**

- CKD due to, 365
- in diabetes, management of, 155–164. See also *Diabetes mellitus, lipid management in*.
- in prevention of cardiovascular outcomes in type 2 diabetes, 218–219
- renal failure due to, 365–366
- renal replacement therapy effects on, 387

**Lipoprotein(s)**

- abnormalities associated with, diabetes-related, 155–156
- low-density, malondialdehyde-modified, as biomarker of plaque instability or rupture, 497–498

**Lipoprotein-associated phospholipase A2, as biomarker of inflammation, 494**

**Low-density lipoprotein, malondialdehyde-modified, as biomarker of plaque instability or rupture, 497–498**

**M**

**Malondialdehyde-modified low-density lipoprotein, as biomarker of plaque instability or rupture, 497–498**

**Medical errors, in ED triage for ACS, prevention of, 601–614. See also *Acute coronary syndrome (ACS), ED triage for, medical error prevention in*.**

**Metformin, in prevention of cardiovascular disease in diabetics, 128**

**Microalbuminuria, CKD and, 350–351**

**Microinflammation, chronic, CKD and, 355–357**

**Microvascular disease, NOCAD due to, 561–562**

**Microvascular dysfunction**

- cardiomyopathy and, NOCAD due to, 561
- hypertension and, NOCAD due to, 561
- idiopathic, NOCAD due to, 562
- infiltrative disease and, NOCAD due to, 562

**M**

- Microvascular dysfunction (*continued*)
  - NOCAD due to, 560–562, 565
  - valvular disease and, NOCAD due to, 562
- Microvascular endothelial dysfunction, NOCAD due to, 561, 565
- Microvascular system, function of, 560
- Migraine(s)
  - closure of intracardiac shunt effects on, 94
  - patent foramen ovale in, 91–96.
    - See also *Patent foramen ovale, in migraine headache.*
- MSCT, for triaging patients presenting to ED with chest pain, 545
- Myeloperoxidase, oxidative stress and inflammation in uremic patients through, 323–324
- Myocardial bridging, NOCAD due to, 561, 564–565
- Myocardial infarction, ACS without, evaluation of, imaging in, 519
- Myocardial ischemia, in ED and CPU patients, troponin for, 456–457
- Myocardial performance index, missed diagnoses of ACS in ED due to, 440
- Myocardial perfusion imaging, acute, in suspected ACS evaluation, 517–518
- Myocardial scintigraphy, *vs.* exercise testing, in CPUs, 511–512
- Myocardial stress, in CKD, biomarkers of, 357–358
- Myoglobin
  - in ED and CPUs, 455
  - missed diagnoses of ACS in ED due to, 438–439

---

**N**

- NAVIGATOR trial, in prevention of cardiovascular outcomes in type 2 diabetes, 217
- Negative predictive value, in suspected ACS evaluation, 519–521
- Nephropathy, contrast-induced pathophysiology of, 301–302
  - prevention of, 302–304
- Nesiritide, in ADHF management in EDOU, 582

**P**

- Pain, chest, in ED
  - EBCT for triaging patients with, 541–548
  - MSCT for triaging patients with, 545
- Patent foramen ovale, 1–6
  - aneurysmal, 40–41
  - closure devices for
    - assessment of, randomized trials of, 16–17
    - described, 13–14

indications for, 17–18  
operator skills with, 19–20  
overview of, 14–15  
patient and family education related to, 18–19  
placement of  
  echocardiographer's role in, 53–64  
  echocardiography in, general approach to, 53–54  
  intracardiac echocardiography in, pertinent views to obtain with, 57–60  
  three-dimensional echocardiography in, 60–64  
  transesophageal echocardiography in, 54–57  
published reports of, 15–16  
closure of, 73–83  
  atrial septal anatomy effects on, 39–40  
  atrial septal defect-related, in pediatric patients, 42–43  
  cardiac catheterization laboratory set-up for, 21–22  
  catheter approach to, 41–42  
  closure devices for, 13–35  
  complications of  
    management of, 30–32  
    prevention of, 30–32  
    recognition of, 30–32  
congenital heart disease and, 37–39  
decompression pathology related to, 99–100  
defined, 1–2  
diagnosis of, 47–52  
  three-dimensional echocardiography in, 51  
  traditional methods in, 47  
  transesophageal echocardiography in, 49–51  
  transthoracic echocardiography in, 47–49  
diving and, 97–104  
  accidents related to, history of, 98  
  changing patency over time, 100–102  
  increased risk with, 98–99  
  prospective evaluation of, 100  
effectiveness of, 43  
hand-off back to referring physician after, 29–30  
hematologic ramifications of, 65–71. See also *Patent foramen ovale, hypercoagulable state in*  
  medical therapy for, 69–70  
historical perspective of, 35–36, 73–83  
  Amplatzer atrial septal defect occluder, 78–79  
  Angel Wings device, 79–80  
  atrial septal defect occlusion system, 81–82  
  buttoned device, 79  
  CardioSEAL septal occluder, 77  
  Helex device, 81  
  percutaneous devices, 74–77  
  STARFlex septal occluder, 78  
  transcatheter patch occlusion, 80–81  
hypercoagulable state in, 65–71  
  arterial, 66–67  
  implications of, 67–68  
  testing for, 68–69  
  venous, 65–66  
in migraine headache, 91–96  
  positive effect of, 93–94  
  prevalence of, 91–93  
in special patient populations, 32–33  
informed consent for, 18–19  
mechanisms for, 5  
out-patient follow-up issues, 29–30  
pathophysiology of, 2–5  
patient preparation for, 21  
pediatric cardiologist in, 35–45  
  future role of, 44  
percutaneous devices in, historical perspective of, 74–77  
platypnea-orthodeoxia syndrome and, 85–89. See also *Platypnea-orthodeoxia syndrome*  
postprocedure care, 28–29  
procedure of, 22–28  
risks associated with, 43–44  
shunt detection in, traditional, 47  
size of, 5  
stroke and, 7–11  
  prevalence of, 7–8  
temporary balloon occlusion trial in, 37–39  
Patient education, patent foramen ovale closure device-related, 18–19  
Peptide(s), B-type (brain) natriuretic, as biomarker of cardiac ischemia, 494–495  
Percutaneous coronary intervention, coronary artery bypass grafting vs. in diabetics, 187–193. See also *Diabetes mellitus, percutaneous coronary intervention vs. coronary artery bypass grafting in*  
Percutaneous devices, in patent foramen ovale closure, historical perspective of, 74–77  
Percutaneous patent foramen ovale, closure of, 13–35. See also *Patent foramen ovale, closure of*

Peripheral arterial disease, in CKD, management of, 225–236. See also *Chronic kidney disease (CKD), peripheral arterial disease in, management of*.

Peripheral vascular disease, in CKD, risk factors for, 289–290

Perivascular drug delivery, local, for venous neointimal hyperplasia in dialysis access, 265

Phospholipase A2, lipoprotein-associated, as biomarker of inflammation, 494

Plaque instability or rupture, biomarkers of, 497–498

Plasma protein-A, pregnancy-associated, as biomarker of plaque instability or rupture, 497

Platypnea-orthodeoxia syndrome  
clinical entities associated with, 85–86  
diagnosis of, 87–88  
noncardiac mechanisms of, 86–87  
patent foramen ovale and, 85–89  
pulmonary perfusion abnormalities with, 87  
underlying mechanisms of, 85–86

POCT. See *Point-of-care testing (POCT)*.

Point-of-care testing (POCT)  
cardiac biomarker. See *Cardiac biomarker POCT*.  
in CPUs, 467–490. See also *Cardiac biomarker POCT, in CPUs*.  
defined, 467–468  
goals of, 467–468  
trends in, 467–468

Polytetrafluoroethylene grafts  
failure of, pathology of, 258–260  
for vascular access in hemodialysis, 250–251  
venous stenosis in, pathogenesis of, 260–262

Predictive value, negative, in suspected ACS evaluation, 519–521

Pregnancy-associated plasma protein-A, as biomarker of plaque instability or rupture, 497

PROactive trial, in prevention of cardiovascular outcomes in type 2 diabetes, 216

Protein(s)  
binding, fatty acid, in ED and CPUs, 455  
C-reactive, as biomarker of inflammation, 492–494  
fatty acid binding, in ED and CPUs, 455

Protein-A, plasma, pregnancy-associated, as biomarker of plaque instability or rupture, 497

Proteinuria, CKD and, 350–351

Pulmonary perfusion abnormalities, platypnea-orthodeoxia syndrome and, 87

**Q**

Q waves, in ACS diagnosis, 434

**R**

Race, as factor in missed diagnoses of ACS in ED, 442–443

Radiation therapy, for venous neointimal hyperplasia in dialysis access, 264–265

Radiopharmaceutical issues, in suspected ACS evaluation, 522–523

RECORD study, in prevention of cardiovascular outcomes in type 2 diabetes, 216

Reimbursement issues, CPU-related, 591–593

Renal disease  
chronic, hypertension in, 237–248. See also *Hypertension, in CKD*.  
high-risk, percutaneous coronary interventions for, 299–310  
incipient, cardiovascular risk in, 311–312  
risk factor profile, 312–313

Renal failure  
cardiovascular disease and, pathophysiology of, 311–317  
accelerated atherogenesis in, 313  
central arteries in, 313  
heart in, 313–314  
risk factor profile in, 312–313  
in diabetes with hypertension, treatment of, 147  
in ED and CPUs, troponin for, 460–461  
lipids and, 365–366  
vascular calcification in, 373–384  
described, 373  
detection of, 376–380  
mechanisms of, 374–376  
prognosis of, 380

Renal replacement therapy  
blood pressure effects of, 386–387  
calcium–phosphate metabolism effects of, 387–388  
cardiovascular disease in patients on, 349–350  
cardiovascular events due to, 388–389  
effects on cardiac geometry, 387  
effects on systolic function, 387  
future directions in, 389

homocysteine levels and, 388  
 hyperparathyroidism effects of, 387–388  
 lipid profile effects of, 387  
 newer paradigms in, **385–391**  
 nocturnal hypoxemia and, 388

Renal transplant recipients, cardiovascular disease in  
 causes of, 331–335  
 CHF and, 333–334  
 incidence of, 332  
 ischemic heart disease and, 334–335  
 left ventricular hypertrophy and, 332–333  
 management of, **331–342**  
   anemia management in, 338  
   antiplatelet agents in, 337  
   beta-blockers in, 337  
   blood pressure targets in, 336  
   cholesterol reduction in, 335–336  
   lifestyle modification in, 335  
   renin-angiotensin antagonists in, 336–337  
   revascularization in, 338–339  
   risk-factor modification in, 335–338  
 prevalence of, 332  
 risk factors for, 332–335  
   nontraditional, 338

Renin-angiotensin antagonists, in cardiovascular disease in renal transplant recipients  
 management, 336–337

Renin-angiotensin system  
 in diabetes mellitus, **167–185**. See also *Diabetes mellitus, renin-angiotensin system in*  
 in hypertension, 238  
 interruption of, in CHF in CKD management, 279

Reperfusion therapy, for ACSs, 407

Revascularization interventions, in prevention of cardiovascular outcomes in type 2 diabetes, 218

---

**S**

Scintigraphy, myocardial, *vs.* exercise testing, in CPUs, 511–512

Second National Health and Nutrition Examination Survey mortality study, 346

Secretagogue(s)  
 insulin, 123–126. See also *Insulin secretagogues*  
 nonsulfonylurea, 127  
   limitations of, 127  
   mechanism of action of, 127

---

**T**

Technetium-99m sestamibi myocardial perfusion imaging, missed diagnoses of ACS in ED due to, 440

Selectin(s), as biomarker of inflammation, 495  
 Sensitivity, in suspected ACS evaluation, 518–519  
 Septum, atrial, anatomy of, 36–37  
 Serum amyloid A, as biomarker of inflammation, 495  
 Shunt(s), intracardiac, closure of, effect on migraines, 94  
 Smoking cessation  
   for CHF in CKD, 279  
   for peripheral arterial disease in CKD, 229–230

Sodium, in hypertension, 237–238

Spasm, coronary, NOCAD due to, 561, 563–564

ST elevation, in ED and CPU patients, troponin for, 456–457

STARFlex septal occluder, in patent foramen ovale closure, 78

Statin(s)  
   for CHF in CKD, 279  
   for cholesterol reduction, in cardiovascular disease in renal transplant recipients management, 335–336  
   for peripheral arterial disease in CKD, 228–229

ST-elevation myocardial infarction (STEMI), recognition and treatment of, thrombolytic predictive instrument in, 606

STEMI. See *ST-elevation myocardial infarction (STEMI)*.

Stent(s), coated, for venous neointimal hyperplasia in dialysis access, 265

Stress, oxidative. See *Oxidative stress*.

Stroke  
   described, 7  
   patent foramen ovale and, **7–11**

Sulfonylurea(s), 123–126  
   described, 123–124  
   mechanism of action of, 124–126

Sympathetic nervous system, in hypertension, 239–240

Therapeutic turnaround time (TTAT), in cardiac biomarker POCT, 477–478

Thiazide diuretics, for diabetes and hypertension, 143–144

Thiazolidinedione(s), in prevention of cardiovascular disease in diabetics, 128–131  
blood pressure effects of, 129–130  
described, 128  
endothelial function effects of, 130–131  
lipid metabolism and oxidation in, 129  
mechanism of action of, 128–129  
vascular reactivity effects of, 130–131  
vascular wall abnormalities due to, 130–131

Three-dimensional echocardiography  
in patent foramen ovale closure device placement, 60–64  
in patent foramen ovale diagnosis, 51

Thrombolysis, for ACSs, 406–407

Thrombolytic predictive instrument  
clinical effectiveness trial, 606–608  
in recognition and treatment of STEMI, 604

Thrombosis, in diabetes mellitus, 203–204

Time-insensitive predictive instrument (TIPI)  
information system cardiac error reduction system, based on ACI-TIPI demonstration project, 608–611

Timeliness, in cardiac biomarker POCT, 478–479

TIPI. See *Time-insensitive predictive instrument (TIPI)*.

Toxin(s), in hypertension, 240

Tracer injection, in suspected ACS evaluation, timing of, 523–524

Transcatheter patch occlusion, in patent foramen ovale closure, 80–81

Transesophageal echocardiography  
in patent foramen ovale closure device placement, 54–57  
in patent foramen ovale diagnosis, 49–50

Trans-theoretic Y model application, of CPUs, 594, 596–598

Transthoracic echocardiography, in patent foramen ovale diagnosis, 47–49

Troponin  
in ED and CPUs, 453–455  
for high-risk patients with ACSs, 457–458  
for intermediate and low risk patients, 458–460  
for patients with ST elevation and myocardial infarction, 456–457  
for renal failure patients, 460–461  
in suspected ACS evaluation, 523  
missed diagnoses of ACS in ED due to, 438

Troponin I, myocardial stress and, 357–358

Troponin T, myocardial stress and, 357–358

TTAT. See *Therapeutic turnaround time (TTAT)*.

---

**U**

Unbound free fatty acid, as biomarker of cardiac ischemia, 496

Uremia  
antioxidants in, 324–325  
arteriosclerotic cardiovascular disease and, 354  
oxidative stress and inflammation in, myeloperoxidase and, 323–324

---

**V**

VADT trial, in prevention of cardiovascular outcomes in type 2 diabetes, 215

Valve replacement, in CKD, 350

Valvular disease, microvascular dysfunction and, NOCAD due to, 562

Vascular calcification  
CKD and, 357  
in renal failure, 373–384. See also *Renal failure, vascular calcification in*

Vascular endothelial function, renin angiotensin system in, in diabetes mellitus, 172–173

Vasodilator(s), in ADHF management in EDOU, 582

Venous neointimal hyperplasia, in dialysis access, novel therapies for, 264–266

Vitamin E-bonded hemodialyzers, 326

---

**W**

Water, in hypertension, 237–238

Weight, body, cardiovascular disease in diabetics and, 132

Whole blood choline, as biomarker of plaque instability or rupture, 497

Women, in CPUs, management of, 549–551

